A NEW SPECIES OF CAVE-DWELLING, HYLID FROG FROM MITCHELL PLATEAU, WESTERN AUSTRALIA

by MICHAEL J. TYLER* AND MARGARET DAVIES*

Summary

TYLER, M. J. & DAVIES, M. (1979) A new species of cave-dwelling, hylid frog from Mitchell Plateau, Western Australia. *Trans. R. Soc. S. Aust.* 103(6), 149-153, 31 August, 1979.

A new species of *Litoria* is described. It is of moderate size (males 44-51 mm; females 50-57 mm S-V), and is a further representative of the *L. caerulea* group. Amongst its osteological features it is unique in *Litoria* in exhibiting a supraorbital sphenethmoid flange.

Introduction

For over a century *Litoria caerulea* (Shaw) was considered a highly distinctive hylid frog, and in fact Gunther (1858) erected the genus *Pelodryas* and family Pelodryadidae to accommodate it. The species was first reported from South Australia by Tyler (1977). Tyler *et al.* (1977) described the new species *Litoria splendida* which they considered derived from it, and Tyler and Davies (1978) associated the two species within a species group.

This paper describes a further new species of the *L. caerulea* species group.

Materials and Methods

The specimens reported here are deposited in museums abbreviated as follows: KU — Museum of Natural History, University of Kansas; SAM — South Australian Museum; WAM — Western Australian Museum.

Methods of measurement follow those of Tyler (1968), whilst the abbreviations used in referring to various features employed in morphometric investigations are: E-N eye to naris distance; HL head length; HW head width; IN internarial span; S-V snout to vent length; TL tibia length.

The format of the osteological descriptions follows Trueb (1979).

Litoria cavernicola new species

Holotype

WAM R43228. An adult male collected approximately 3 km west of Surveyors Pool, Mitchell Plateau, Kimberley Division, Western Australia, on 17 February, 1973 by L. A. Smith and R. E. Johnstone.

Definition

The characteristic features of this species are its moderate size (males 44-51 mm; females 50-57 mm S-V length); long and slightly webbed fingers with large discs, partially webbed toes, large distinct tympanum and coarsely granular skin. The animal is a dull green or greenish brown in life.

Description of holotype

Head slightly broader than long (HL/HW 0.92), its length equivalent to one-third of the snout to vent length (HL/S-V 0.35). Snout prominent, truncated when viewed from above and in profile. Nostrils more lateral than superior; their distance from end of snout considerably less than that from eye. Distance between eye and naris greater than internarial span (E-N/IN 1.20). Canthus rostralis moderately defined and straight. Eye large and prominent, its diameter greater than eye to naris distance. Tympanum large and entirely visible, its diameter four-fifths of eye diameter (Fig. 1).

Vomerine teeth extremely prominent, on greatly elevated series almost entirely posterior to choanae. Tongue broad.

Fingers long and with scarcely detectable lateral fringes; in decreasing order of length $3 > 4 > 2 > 1$. Webbing between fingers only basal. Terminal discs broad, oval and truncated distally (Fig. 2). Subarticular tubercles very large and prominent.

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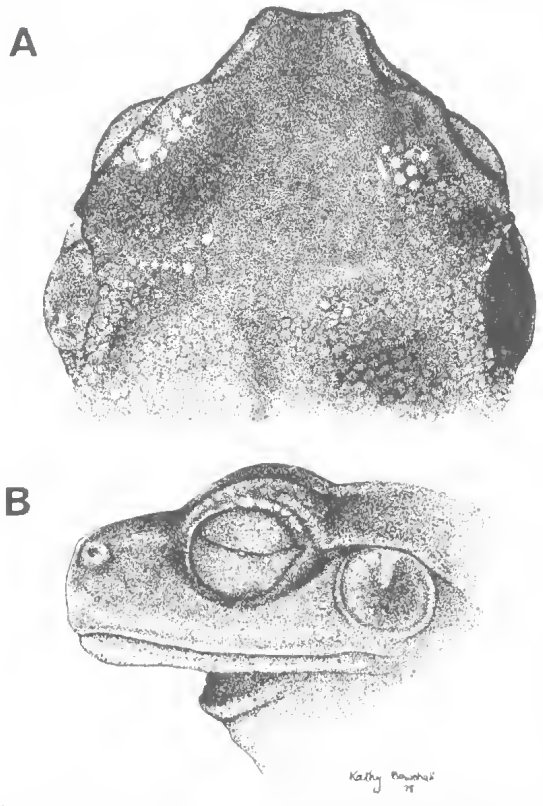

Fig. 1. (A) dorsal and (B) lateral views of the head of *Litoria cavernicola*. Paratype WAM R44328.

Hind limbs rather short (TL/S-V 0.48). Toes in decreasing order of length 4 > 5 > 3 > 2 > 1. Webbing on toe 5 reaches slightly above subarticular tubercle at base of penultimate phalanx; extends to subarticular tubercle at base of penultimate phalanx of toe 4 and continues to discs in form of broad lateral fringe. Subarticular tubercles prominent. Large oval inner and small rounded outer metatarsal tubercles (Fig. 2).

Dorsum coarsely granular; skin fold along posterior edge of forearm and slight tarsal fold. Supratympanic fold narrow. Ventral surfaee coarsely granular.

In preservative the dorsum is a uniform pale brown and the ventral surface uniform pale cream.

This male speeimen has unpigmented nuptial pads, and a submandibular vocal sac with short apertures near the artieulation of the jaws.

Dimensions of holotype

Snout to vent length 48.0 mm; head length 16.7 mm; head width 18.2 mm; tibia length 23.0 mm; eye to naris distance 4.8 mm; internarial span 4.0 mm; eye diameter 5.3 mm; tympanum diameter 4.2 mm.

Variation

There are 14 paratypes: WAM R43329-30 collected with the holotype by L. A. Smith and R. E. Johnstone; WAM R60680-84 collected at East Mitchell Falls, by W. H. Butler on 4.11.78; WAM R61624-30 sandstone upon Mitehell Plateau, W. H. Butler 20-28.2.79. Five of the paratypes are adult males (44-50 mm S-V) and two are females (50 and 57 mm S-V respeetively). The larger of the females is gravid; the smaller has few ova but convoluted oviducts and may have deposited ova shortly before capture.

The overall proportions of the paratypes are similar (HL/HW 0.89-1.05; HL/S-V 0.32-0.37; E-N/IN 1.13-1.38). The tympanum is clearly defined and a distinctive feature in all representatives. Webbing shows no detectable variation. The skin is coarsely granular in the series collected at Surveyors Pool, but less conspicuously granular in the series from the East Mitehell Falls.

Osteology (based on WAM R60681—Fig. 3)

Skull moderately well ossified, broader than long; sphenethmoid well ossified projecting between nasals almost to anterior extremities. Ventrally ossified portion of sphenethmoid extends between the prevomers to the level of their anterior extremities. Supraorbital sphenethmoid flanges present laterally, abutting with anterior extremities of frontoparietals. Prootic and exoccipital bones fused completely. Crista parotica narrow, moderately short, widely separated from otic ramus of squamosal; epio-

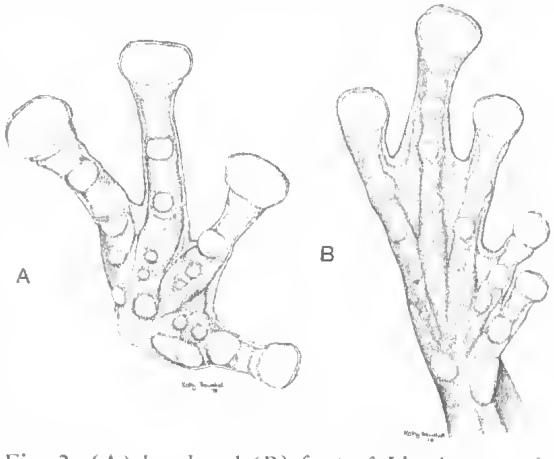

Fig. 2. (A) hand and (B) foot of *Litoria cavernicola*. Paratype WAM R44328.

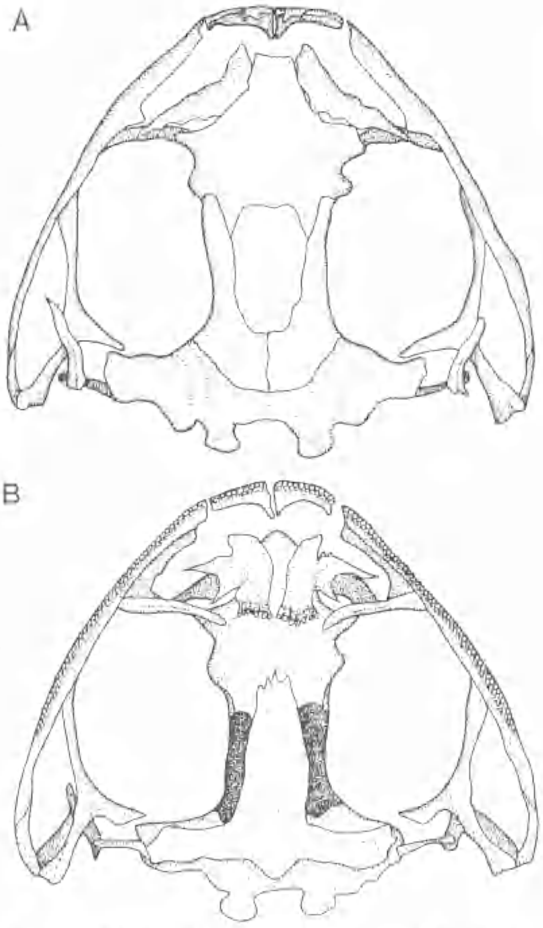

Fig. 3. (A) dorsal and (B) ventral view of the skull of *Litoria cavernicola*.

tic eminences prominent. Frontoparietal fontanelle moderately large, ovoid, anterior margin at level approximately 1/3 anteriorly on length of orbit, posterior margin 7/8 posterior on length of orbit. Lateral margins of frontoparietals straight. Frontoparietals not expanded posterolaterally to overlap crista parotica.

Nasals slender, widely separated medially, arched laterally, articulating with sphenethmoid anteromedially. Maxillary process of nasal slender, does not articulate with short preorbital process of moderately deep pars facialis of maxillary. Palatines moderately long, slender, ridged slightly, curved posteromedially, lying on bony sphenethmoid, laterally lying alongside maxillaries. Parasphenoid robust with short, broad, irregularly truncate cultriform process terminating approximately 1/3 anteriorly along length of orbit; alae long, narrow, at right angles to cultriform process, not overlapped laterally by short, robust medial arm of pterygoid.

Pterygoid moderately well developed, medial arm not in bony contact with prootic region, anterior arm articulating with maxillary at level approximately 1/3 anteriorly along length of orbit. Quadratojugal well developed, robust, firmly articulating with maxillary anteriorly and shaft of squamosal posteriorly. Squamosal moderately robust, otic plate absent, zygomatic ramus moderately well developed, slightly longer otic ramus. Maxillary and premaxillary dentate. Alary processes of premaxillaries moderately separated medially and perpendicular to the dentigerous processes. Palatine processes of premaxillaries well developed, do not quite meet medially. Shallow palatal shelf with no pterygoid process.

Prevomers entire, anterior alae reduced, lateral alae forming margins of choanae. Dentigerous proceses robust, moderately short and horizontal to the midline bearing seven teeth. Bony columella present.

Arciferal pectoral girdle robust. Omosternum and xiphisternun present. Sternum cartilaginous, well developed. Clavicles slender, arched, closely juxtaposed medially. Coracoids well developed, widely separated medially. Scapula bicapitate, slightly longer than clavicle. Supracapula 2/3 ossified.

Eight procoelous nonimbricate presacral vertebrae. Widths of transverse processes III = SD > IV > VI > II = VII = VIII > V. Sacral diapophyses moderately expanded, ilia project to their anterior extremeities. Urostyle bicondylar bearing a dorsal crest extending for

TABLE 1.

Comparison of size and proportions of L. caerulea *and* L. cavernicola *sp. nov. from the Mitchell Plateau.*

	n	S-V ♂♂	S-V ♀♀	E-N/IN	HL/HW	HL/S-V	TL/S-V
L. caerulea	13	67–77	72	0.89–1.08	0.86–0.96	0.29–0.32	0.39–0.44
L. cavernicola	8	44–50	50–57	1.13–1.38	0.89–1.05	0.32–0.36	0.42–0.50

about 3/4 of its length. Vestigial transverse processes absent.

Humerus bearing moderate anteroproximal crest. Phalangeal formula of hand 2-2-3-3; distal tips of phalangeal element clawed; intercalary structures very short and cartilaginous; bony prepollex present. Phalangeal formula of foot 2-2-3-4-3; vestigial bony prehallux present.

Comment: The presence of a supraorbital sphenethmoid flange has not been reported previously in the Hylidae. Supraorbital frontoparietal flanges are not uncommon, but the anterior progression of the flange is unusual.

Comparison with other species

The overall habitus of *L. cavernicola,* size of digital discs, presence of interdigital webbing and colour in life are all reminiscent of *L. caerulea,* and the relationship with that species appears closer than with any other congener. Accordingly it has been compared with individuals of *caerulea* from various parts of that species' range and a detailed morphometric comparison made with a series of 13 *L. caerulea* taken upon the Mitchell Plateau: KU 180663-64, SAM R17147-R17155. Table 1 demonstrates that *L. cavernicola* is significantly smaller, has more narrowly spaced nostrils (so producing a higher E-N/IN ratio), lacks the short head of *L. caerulea* (HL/S-V 0.32-0.37, compared with 0.29-0.32 in *L. caerulea*). *Litoria cavernicola* has longer legs; only one specimen having a TL/S-V ratio below the maximum for *L. caerulea.*

Litoria cavernicola lacks the large parotoid glands of *L. caerulea,* which in that species obscure the upper and posterior margins of the tympanum. Thus in *L. cavernicola* the tympanic annulus is entirely visible.

Features of the skull of *L. cavernicola* have much in common with *L. caerulea.* However some quite considerable differences have been observed as follows: nasals of *L. cavernicola* are more slender than those of *L. caerulea* whilst the sphenethmoid is more ossified in the former species. A supraorbital sphenethmoid flange is present in *L. cavernicola* compared with a small supraorbital frontoparietal flange in *L. caerulea.* The zygomatic ramus of the squamosal is shorter and otic ramus longer in *L. cavernicola* than *L. caerulea.* The preorbital process of the pars facialis is in bony contact with the maxillary process of the nasal in *L. caerulea* but not in *L. cavernicola.* The alary processes of the premaxillaries are perpendicular in *L. cavernicola* and curved posteriorly in *L. caerulea.* The anterior alae of the prevomers are reduced in *L. cavernicola* but not in *L. caerulea.* The cultriform process of the parasphenoid is irregularly truncate in *L. cavernicola* but acuminate in *L. caerulea* whilst the alae are at right angles to the cultriform process in *L. cavernicola* but directed slightly posterolaterally in *L. caerulea.*

Relative widths of the transverse process of the presacral vertebrae differ, being III = SD > IV > VII > II = VII = VIII > V in *L. cavernicola* and III = SD > IV > V = VI = VII = VIII > II in *L. caerulea.*

Litoria splendida is a further representative of the *L. caerula* species group as defined by Tyler and Davies (1978). It is a large species (up to 100 mm S-V) and is distinguished from *L. cavernicola* by possession of vast, hypertrophied, supracranial glands and conspicuous pale yellow spots upon the green dorsum.

Habitat

Litoria cavernicola has been collected only from large caves in sandstone gorges. Elsewhere in the Kimberleys such caves are inhabited by *L. caerulea* and *L. splendida.*

Distribution

Only known from the gorges bordering the Mitchell Plateau, W.A., but possibly widespread in comparable gorges in the inaccessible country (subhumid northwest Kimberley).

Etymology

The specific name is derived from the Latin *caverna* (a hollow; cave or cavern) and *cola* (inhabitant).

Acknowledgements

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OSTRACODS FROM THE MOUND SPRINGS AREA BETWEEN STRANGWAYS AND CUDIMURKA, SOUTH AUSTRALIA

BY P. DE DECKKER

Summary

Ngarawa dirga n.gen., n.sp. of the new subfamily Ngarawinae, is described from mound springs and spring seeps in the Strangways-Curdimurka area, southwest of Lake Eyre South. Two other cyprididid ostracods are recorded from temporary pools in the same area: Reticypris walbu n. sp. and Heterocypris tatei (Brady, 1886). The latter species is redescribed and recorded from some mound springs.